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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/802,835	03/18/2004	Xavier Fourquin	066829-5102	4262

9629 7590 12/07/2007

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EXAMINER	
HAN, QI	

ART UNIT	PAPER NUMBER
2626	

MAIL DATE	DELIVERY MODE
12/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/802,835	FOURQUIN ET AL.	
	Examiner	Art Unit	
	Qi Han	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-21 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-21 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 18 March 2004 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date 03/18/2004.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The references listed in the Information Disclosure Statement submitted on 03/18/2004 have been considered by the examiner (see attached PTO-1449).

Specification and Drawing

3. The disclosure is objected to because of the following:

a. on page 3, lines 2, 15, 18 the term "digital **sung** signal" is unclear or confused. Is that means "digital sound signal", or something else? (similar term is also found on page 4, lines 4 and14; page 7, lines 10-11; page 1, line 11). Appropriate correction/clarification is required.

b. on page 5, lines 28-32, the stated feature "The mixer means 4 therefore replace the fundamental frequency and the harmonics of the voice signal by the fundamental frequency and the harmonics of each of the notes of the music signal during the note" lacks reasonably clear/specific description for implementing it, because the disclosure of two proportions of 20ms-frame speech and music signals in the last step/mechanism (see lines 23-27) is only one time domain characteristic, and the range of fundamental frequency is much narrower that that of music. Therefore, the disclosure is inefficient to enable one of ordinary skill in the art to replace

fundamental frequency and the harmonics from that of speech to that music. Appropriate correction/clarification is required.

c. between page 5, lines 28-32 and page 6, lines 1-2, the statement "**replace** the fundamental frequency and the harmonics of the **voice** signal **by** the fundamental frequency and the harmonics of each of the notes of the **music** signal during the note" directly conflicts with the statement "a proportion Y% of a **musical** sinusoidal signal deduced from the signal S2 **is substituted** for a proportion X% of the speech sinusoidal signal." Appropriate correction is required.

d. on page 6, lines 29-34, the statement "said (a) power peak corresponding to the fundamental frequency of a vowel" is not true, since a power peak only indicates one of harmonics and normally not the fundamental frequency. In order to find a fundamental frequency, more process(es) need to be done, but the applicant did not disclose them. Appropriate correction/clarification is required.

e. on page 6, line 35 to page 7, lines 5, it says that "the **vocoder** 6 of the terminal **includes** a voice activity detector (**VAD**) ..." and "if the amplitude of the voice signal tends towards zero, the VAD may force the mixer means to move on to the next note of the score"; meanwhile, Fig.1 shows that the mixer 4 is processed the signals before the vocoder 6. Therefore, the VAD (in the vocoder) forcing the mixer is logically/structurally incorrect, or not enable. Appropriate correction is required.

f. The drawings (Figs 1-5) are objected to because all the text labels (legends) regarding the function blocks in Figs 1-5 are missing. In this case, the applicant is required to provide text label(s) for each functional block in the drawings, based on the disclosure in the

specification and associated with the reference number, for the propose of better understanding the claimed invention and comparing the different structures between the disclosed drawings and/or prior art drawings. (Also see 37 CFR 1.84 (o)).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

It is also reminded that there is no new subject matter allowed in any amended specification and drawing.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-21 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claims 1 and 11, the claimed term "digital **sung** signal" (also included in claims 5-6, 10, 12, 16-17, 21) is indefinite, because it is unclear what the term really is. It is noted that "digital sung signal" is not commonly accepted/used term in the art and lacks clear definition/description in the specification.

Regarding claims 2-10 and 12-21, the rejection is based on the same reason as described for claims 1 and 11, because the dependent claims include or inherit the same or similar problematic limitation as their parent claim(s).

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 3-4 and 14-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claims 3 and 14, the claimed limitation "means for replacing the fundamental frequency of said speech signal by the fundamental frequency associated with a note of said music signal" lacks enablement to one of ordinary skill in the art based on the disclosure of the

specification (see the closet disclosure of the specification: page 5, line 28 to page 6, line 34). It is noted that no where in the specification specifically describes how to obtain/extract a fundamental frequency of the speech signal, and the disclosure "said power peak corresponding to the fundamental frequency of a vowel" (page 6, line 31-32) is incorrect and inefficient to obtain a fundamental frequency of the signal. Further, it is well known in the art that the range of fundamental frequencies of human speech is much narrower than that of musical instruments, so that the replacement cannot be easily implemented by one of ordinary skill in the art without solving this problem; otherwise, the replacement cannot be enabled or lacks meaningful operation. There is no evidence in the specification to solve this problem to one of ordinary skill in the art. Furthermore, it is noted that the claim limitation conflicts with the specification disclosure that states "a proportion Y% of a **musical** sinusoidal signal deduced from the signal S2 **is substituted** for a proportion X% of the speech sinusoidal signal" (page 5, line 35 to page 6, line 2) (meaning musical signal is placed by speech). Therefore, the claim contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention, without undue experimentation.

Regarding claims 3 and 15, the rejection is based on the same reason as described for claims 1 and 14, because the dependent claims include or inherit the same or similar problematic limitation as their parent claim(s).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE et al. (US 5,641,927) hereinafter referenced as PAWATE in view of BOSS et al. (US 5,915,237) hereinafter referenced as BOSS.

As per **claim 1**, as best understood in view of the rejection under 35 USC 112 2nd (see above), PAWATE discloses 'autokeying for musical accompaniment playing apparatus (audio device)' (title), comprising:

"input by the user of said audio device of an analog speech signal" (Fig.2, 'user's vocal'),

"converting said analog [speech] signal into a digital [speech] signal comprising at least one fundamental frequency" (Fig. 2 shows a microphone and 'pitch (corresponding to fundamental frequency) estimator 23'),

"storing a set of coded data [representing a musical score comprising a set of notes, each note being defined by a fundamental frequency, a duration, and an instrument that plays said note]" (col. 2, lines 54-67, 'the key (corresponding to pitch) of the music may also be stored in the CD data (set of coded data) field so not have to be computed'),

"extracting a digital music signal from said set of coded data" (col. 2, lines 54-67, 'the pitch estimated and averaged from the original artist's voice (musical signal), or key (corresponding to pitch) from the background music or that from the CD data field is compared (necessarily extracting music from the related data)'), and

"mixing a first portion of said digital [speech] signal and a first portion of said digital music signal to produce a digital [sung] signal" (col. 3, lines 1-40, 'change the key (portion of

music) of background music' and 'output (produce) to the mixer 13a to add the user's vocal (portion of the input digital signal; also see Figs, 2 and 2a).

It is noted that PAWATE does not expressly disclose the input digital signal being "**speech** signal" and the coded data "representing a musical score comprising a set of notes, each note being defined by a fundamental frequency, a duration, and an instrument that plays said note". However, this feature is well known in the art as evidenced by BOSS who discloses 'representing speech using MIDI (musical instrument digital interface)' (title), comprising well known feature of MIDI data for generating music including 'identifying a musical instrument (i.e. piano, clarinet) for music generation, turning on a note (reflecting a musical score) or altering a parameter in order to generating or control sound' (col. 2, lines 7-30), which necessarily/inherently includes parameter data of pitch (corresponding to fundamental frequency) and the related time stamps (corresponding to duration) for the music note; 'encoding a digitized speech into a standard digital format, such as MIDI' (col. 2, lines 67 to col. 3, line 5); and using 'a MIDI compatible signal' for processing and storing 'speech segments' in 'the phoneme dictionary' including parameters of 'pitch' and 'duration' (col. 5, line 45 to col. 6, line 28). BOSS also discloses 'mixer 204, ...receives a digitized speech signal...and a digitized music signal... and mixes the two signals together to form a single audio output' (col. 13, lines 30-45), which further supports the claim rejection. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify PAWATE by providing a compatible standard digital format, such as MIDI, for representing a speech and/or music signals, as taught by BOSS, for the purpose (motivation) of efficiently representing, storing and

transmitting sound/audio signal(s) including music and/or speech signals (BOSS: col. 2, lines 27-29 and 56-61; col. 13, lines 58-61).

As per **claim 2** (depending on claim 1), PAWATE in view of BOSS further discloses "a digital signal processor comprising said means for mixing said first portions of said digital speech signal and said digital music signal" (PAWATE: col. 2, line 45 and Fig. 1, block 13).

As per **claim 3** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2nd and 1st (see above), it is noted that the combined references disclose using the mismatch between the two estimated pitches (corresponding to fundamental frequencies) of user and reference (background music) to change (substantially replace) the key (or pitch) of background music (PAWATE : col. 3, lines 1-16 and Figs. 2-2a), which is different from claimed "replacing the fundamental frequency of said speech signal by the fundamental frequency associated with a note of said music signal." However, it would have been obvious to one of ordinary skill in the art to use the same mismatch to change (replace) user's pitch instead of reference's pitch in the same manner, so as to produce the predicable result of the user's speech with a characteristic of the reference's (music's) pitch. It is noted that estimating and comparing pitches uses the same known technique (as taught by PAWATE), and changing (replacing) pitch from one to the other (i.e. from reference's pitch to user's pitch, or from user's pitch to reference's pitch) uses in the same known method, so that, one of ordinary skill in the art would have recognized that solving the difference based on the teachings of PAWATE in view of BOSS would have been obvious and the result would have been predicable as stated above.

As per **claim 4** (depending on claim 3), as best understood in view of the rejection under 35 USC 112 2nd and 1st (see above), PAWATE in view of BOSS further discloses "said

fundamental frequency of said speech signal is replaced by said fundamental frequency associated with said note of said music signal during a period substantially equal to the duration of said note" (BOSS: col. 5, lines 1-47, since the speech encoded into MIDI compatible signal, the time stamp (inherent feature reflecting duration) of a note in music could be easily used to associate with the related phoneme duration, as claimed).

As per **claim 5** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2nd (see above), PAWATE in view of BOSS further discloses "adding to said digital [sung] signal a second portion of said digital speech signal" (PAWATE: col. 3, line 8 'to add the user's vocal' reads on second portion of said digital speech signal; col. 4, lines 13-56, 'envelop', 'residual' and 'lpc' can also be broadly interpreted as second portion of said digital speech signal).

As per **claim 6** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2nd (see above), PAWATE in view of BOSS further discloses "adding to said digital [sung] signal a second portion of said digital music signal" (PAWATE: col. 3, lines 1-16, wherein other music portions excluding key (or pitch) can be broadly interpreted as second portion of said digital music signal).

As per **claim 7** (depending on claim 1), PAWATE in view of BOSS further discloses "replacing at least one harmonic frequency of said fundamental frequency of said speech signal with a harmonic frequency of said fundamental frequency associated with a note of said musical signal" (PAWATE: col. 8, lines 1-4, 'indicate second or third harmonic'; BOSS: col. 6, lines 29-53, 'measure the pitch of the phoneme represented by the received phoneme pattern by...spectral compression and harmonic matching method'; col. 7, line 25 to col. 8, line26, 'MIDI standard'

that inherently includes parameter for timbre (corresponding to harmonic)'; one of ordinary skill in the art would have recognized that the result of matching harmonic(s) could be used for changing (or replacing) certain harmonic(s) of the user or reference (music) in the same/similar way as for changing/replacing pitch, so that the output audio (result) would have a sound characteristic of harmonic(s) of the music (achieving predicable result), and vice versa).

As per **claim 10** (depending on claim 1), as best understood in view of the rejection under 35 USC 112 2nd (see above), PAWATE in view of BOSS further discloses "a vocoder for coding said [sung] signal" (PAWATE: col. 3, line 63, 'phase vocoder'; col. 4, lines 47-61, 'residual resampling method' with 'LPC' (vocoder feature); BOSS: 'the MIDI speech signal output...may transmitted over ...wireless communication, or telephone lines', so that one of ordinary skill in the art would have recognized that coding the processed signal would be the same as coding normal speech signal by using a vocoder).

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS applied to claim 1, and further in view of KAGEYAMA et al. (US 5,857,171) hereinafter referenced as KAGEYAMA.

As per **claim 8** (depending on claim 1), even though PAWATE in view of BOSS discloses "mixing said first portions of said digital speech signal and said digital music signal" as stated above (see claim 1), PAWATE in view of BOSS does not expressly disclose "discriminating a consonant from a vowel in said digital speech signal" and adapted to activate the mixing. However, the feature is well known in the art as evidenced by KAGEYAMA who discloses 'a vowel/consonant separator 40 (discriminator)' so that 'the consonant and vowel

components can be separated (discriminated) from each other by detecting a fundamental frequency' and 'the vowel synthesizer 43 generates the vowel signal at the pitch specified by the pitch calculator based on the phoneme data distributed by the phoneme data register 48' (Fig.2 and col. 6, line 60 to col. 7, line 52), and teaches that 'the phoneme data track of the song data records only the vowel data of the original or model signer...', which suggests that the system is adapted to activate a mechanism for mixed signal (after envelope generator 44, Fig 2) during detection of the vowel, as claimed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify PAWATE in view of BOSS by providing a mechanism of separating vowel/consonant and activating a mixing process during detection of vowel, as taught by KAGEYAMA, for the purpose (motivation) of creating a harmony voice having a tone other than that of user (actual player, or karaoke singer) (KAGEYAMA: col. 1, lines 31-32).

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS applied to claim 1, and further in view of KAGEYAMA et al. (US 5,712,437) hereinafter referenced as KAGEYAMA2.

As per **claim 9** (depending on claim 1), PAWATE in view of BOSS does not expressly disclose "a **voice activity detector** controlling said means for mixing said first portions of said digital speech signal and said digital music signal." However, the feature is well known in the art as evidenced by KAGEYAMA2 who discloses 'if the detected state of the signing performance indicates a no voice period', some functions/structures 'are disabled' (col. 5, lines 43-55), which suggests that system has a mechanism of detecting voice activity (so as being a

voice activity detector) and determining whether or not a function/component is disabled (so as controlling the function/component). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the mixing means disclosed by PAWATE and BOSS with a mechanism of detecting voice activity for controlling certain function/component as taught by KAGEYAMA2, for the purpose (motivation) of generating a harmony audio signal containing an additional harmony part and/or determining to stop(or start) to harmony sound generation (KAGEYAMA2: abstract and col. 5, lines 54-55).

10. Claims 11-18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS applied to claim 1, and further in view of TANIGUCHI et al. (US 5,712,437) hereinafter referenced as TANIGUCHI.

As per **claim 11**, as best understood in view of the rejection under 35 USC 112 2nd (see above), the rejection is based on the same reason described for claim 1 because the claim recites the same or similar limitations as claim 1, except the preamble limitation "a telecommunication terminal". However, the feature is well known in the art as evidenced by TANIGUCHI who discloses 'music player applicable to portable telephone terminal' (title), comprising 'portable telephone terminal (a telecommunication terminal) incorporating a music player device', 'CPU' and 'speech processor' for 'coding/decoding on speech signals' and producing 'hold sound mixed with received speech' (col. 3, line 30 to col. 4, line 11). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify PAWATE in view BOSS by providing a portable telephone terminal and mixing sound with speech, as taught by TANIGUCHI, for the purpose (motivation) of generating BGM

(background music) mixed with received speech signals for the system (TANIGUCHI: col. 16, lines 34-56).

In addition, in another view of teachings of PAWATE and BOSS, since PAWATE in view BOSS discloses using 'a computer system' implementing the MIDI encoding/decoding systems and including 'a modem for communicating with one or more other computers via the internet, telephone lines or other transmission medium' (BOSS: col. 11, line 58 to col. 12, line 16), the computer system can be broadly interpreted as claimed "a telecommunication terminal". This means that the disclosure by PAWATE in view BOSS can also satisfy the claim for the rejection, based on broadest reasonable interpretation of the claim in light of the specification.

As per **claim 12** (depending on claim 11), PAWATE in view of BOSS and TANIGUCHI further discloses "transmitting said digital sung (sound) signal to another terminal **in real time**" (TANIGUCHI: col. 9, lines 14-30).

Regarding **claims 13-18 and 21** (depending on claim 11), the rejection is based on the same reason described for claims 2-7 and 10, because the claims recites the same or similar limitations as claims 2-7 and 10 respectively.

11. Claim 19 is are rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view of BOSS and TANIGUCHI applied to claim 11, and further in view of KAGEYAMA.

Regarding **claim 19** (depending on claim 11), the rejection is based on the same reason described for claim 8, because the claims recites the same or similar limitations as claim 8.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over PAWATE in view BOSS and TANIGUCHI applied to claim 11, and further in view of KAGEYAMA2.

Regarding **claim 20** (depending on claim 11), the rejection is based on the same reason described for claim 9, because the claims recites the same or similar limitations as claim 9.

Conclusion

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Qi Han whose telephone numbers is (571) 272-7604. The examiner can normally be reached on Monday through Thursday from 9:00 a.m. to 7:30 p.m. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (571) 272-7602.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Inquiries regarding the status of submissions relating to an application or questions on the Private PAIR system should be directed to the Electronic Business Center (EBC) at 866-217-9197 (toll-free) or 703-305-3028 between the hours of 6 a.m. and midnight Monday through Friday EST, or by e-mail at: ebc@uspto.gov. For

general information about the PAIR system, see http://pair-direct.uspto.gov.

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